RESEARCH ARTICLE

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Awareness about Cervical Cancer and HPV Vaccine among Undergraduate College Students in Purba Barddhaman District, West Bengal: A Cross-Sectional Study Velentur

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Abstract

Background: Cervical cancer is a leading cause of mortality among women worldwide. Human Papillomavirus (HPV) plays a definite role in its causation. This study was conducted to assess the level of awareness about cervical cancer and HPV vaccine among urban and rural undergraduate college students in Purba Barddhaman District, West Bengal. **Methods:** The study was conducted among 420 undergraduate students in two co-educational colleges, one urban and one rural. The data was collected using pre-designed pre-tested open-ended questionnaire and analysed using SPSS (version 23.0). A Chi square test and multiple logistic regression analysis was done to assess the association between variables of interest. **Result:** Majority of the study subjects,53.8%, were males from urban college and females,52.8%, from rural college and the mean age was 20.09±2.53 and 19.91±2.24 years in urban and rural college respectively. Regarding the knowledge of cervical cancer, only 33.3% from urban and 28.9% from rural college had heard about cervical cancer and 19.5% from urban and 16.1% from rural college had knowledge about its prevention. Regarding HPV infection, 21.3% from urban and 23.3% from rural college had heard about HPV with 13.8% from urban and 12.7% from rural college had heard about the HPV vaccine. Multiple logistic regression analysis revealed that gender retained its statistical significance with risk factors (p=0.007), signs and symptoms (p=0.007) and modes of prevention (p=0.012) of cervical cancer in urban college. In rural college gender was statistically significant with risk factors (p=0.019) and mother's occupation was statistically significant with risk factors (p=0.011) and signs and symptoms (p=0.004) of cervical cancer. **Conclusion:** Only one-third of the study population had knowledge about cervical cancer and HPV vaccine. Generation of widespread awareness through community participation, mass media involvement and health education is need of the hour.

Keywords: Cervical cancer- HPV- risk factor- under graduate College students

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Introduction

Among Indian women, cervical cancer is the second leading cause of cancer-related deaths. India recorded 123,907 new cases and 77,348 deaths attributable to cervical cancer in 2020, accounting for nearly one-third of the global cervical cancer death burden [1,2]. About 25% of all cervical cancer deaths occurring worldwide, occur in India and the incidence is very high among women in rural areas and low socio-economic status [3]. The important causes of high mortality due to cervical cancer are the lack of awareness and knowledge about its symptoms, risk factors, screening programs, and its preventive measures [4]. The crude rate of incidence and mortality of cervical cancer in India is about 18.7% and 11.7% respectively. Current estimates (2023) indicate that every year 123907 women are diagnosed with cervical cancer and 77348 die from the disease [5].

Early detection and treatment of cervical cancer helps in increase of life expectancy of a woman. Most studies have shown that the survival rate of a woman is improved if cervical cancer is diagnosed and treated at earlier stages [6]. The risk factors associated with cancer cervix are infection with Human Papilloma Virus (HPV), multiple sexual partners, sexual intercourse at an early age, prolonged use of oral contraceptive pills, multiple abortions, smoking, etc [7].

HPV, an important risk factor of cervical cancer and is primarily transmitted through sexual contact in both males and females [4]. The HPV family has more than 200 members and according to their pathogenicity are classified into two groups, oncogenic and non-oncogenic. Oncogenic HPVs, also known as high-risk HPV, are responsible for chronic HPV infections with a high potential for anogenital cancers (penile, anal, cervical, vaginal and vulvar) and head and neck squamous cell

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carcinomas (oral cavity, oropharyngeal and laryngeal and other pharynx cancers) in both sexes [7]. Among more than 14 oncogenic HPVs, the HPV16 and 18 genotypes are the most prevalent among HPV-induced cancers and are involved in more than 70% of the cervical precancerous lesions, cervical cancers and other HPV associated cancers [8]. HPV strains 31, 33, 45, 52 and 58 are also oncogenic, being implicated in 10% to 20% of cervical cancer [9].

HPV vaccination greatly diminish HPV-induced cancers threatening both sexes, especially cervical cancer in females. There are three HPV vaccines, namely Cervarix 2v (GlaxoSmithKline Biologicals, Rixensart, Belgium), Gardasil 4v (Merck&Co, Kenilworth, NJ, USA) and Gardasil 9v (Merck&Co, Kenilworth, NJ, USA) [8, 9]. Cervarix, protects against genotypes 16 and 18 while Gardasil 4v confers protection against HPV 6 and 11, in addition to HPV16 and HPV 18 [9].

Young adults especially those in late teens and early twenties form health related habits and behaviours that persists in adulthood. Education about cervical cancer and HPV vaccine can help them to make decisions about their health. The vaccine is most effective when given before getting exposed to the risk factors like sexual activity etc. Educating young adults can break stigma related to cervical cancer and HPV vaccine. Healthcare access, educational campaigns are easily available in urban areas due to easy access of media and digital platforms rather than in rural areas. In rural areas, conservative attitudes can influence perception on vaccines like HPV vaccine where as urban population are more diverse and can contribute to broader acceptance of the vaccines.

In the above scenario, this study was conducted to assess the awareness about cervical cancer and HPV vaccine among urban and rural undergraduate college students in Purba Bardhaman District of West Bengal and to find out the association between sociodemographic characteristics and awareness about cervical cancer (risk factors, signs and symptoms and modes of prevention) and HPV vaccine, if any.

Materials and Methods

Study design and study population

It is an observational, descriptive, cross-sectional study conducted from September to November 2023 in two co-educational colleges of Purba Barddhaman District, West Bengal affiliated under Burdwan University. The study population comprised of the undergraduate students of the two colleges who were present on the day of study and who gave informed written consent.

Sampling technique and sample size

There are 22 co-educational colleges in Purba Barddhaman District. Among these, 8 colleges are under Burdwan Municipality hence urban and remaining 14 colleges are under Burdwan Panchayat, hence rural. To find out the differences in the knowledge and awareness of cervical cancer and HPV vaccine and due to limited time frame, a purposive sampling technique was used. One college from rural and one college from urban area was selected purposively for the study as per the researcher's convenience. It was done depending on the easy accessibility of the colleges. The study participants in both the colleges ware selected randomly for the study using simple random sampling technique. Taking the prevalence of knowledge of HPV as cause of cervical cancer, as 15% from a study conducted by ML Begum et. Al [10], the sample size was calculated by the Cochran's formula, $n= (Z_{\alpha}^{2}\times P\times Q)/d^{2}$, where an absolute error of 5% was taken at 95% level of confidence interval. Taking a nonresponse rate of 10% the sample size calculated was 216. As the study was done in 2 colleges so the final sample size was 420.

Study tools and study technique:

A predesigned and pretested self-administered open-ended questionnaire was used for data collection. The questionnaire consisted of 2 parts. Part (a) consisted of the sociodemographic variables of the study participants. Part (b) consisted of 6 open ended questions regarding hearing about the term cervical cancer, its risk factors, signs and symptoms, modes of prevention, any test and name of the test which helps in screening of cervical cancer. Another 7 open ended questions were there regarding HPV infection, diseases caused by HPV, mode of spreading HPV infection and HPV vaccination. The questionnaires were used among a set of 50 similar study participants from another college from the urban area and was pretested. Sources of errors were identified and refinement of the questionnaire was done accordingly to minimize measurement error. The questionnaire was translated into Bengali, the local language, by language experts and then back translated into English to maintain semantic equivalence. Both English and Bengali versions were used for data collection. Necessary permission was taken from the college authorities. Study participants were briefed about the purpose of the study and their cooperation was sought. Informed written consent was taken from the students. Confidentiality and anonymity was maintained. Data was collected on the same day in both colleges to prevent contamination effect. On the day of data collection, all students were briefed about the questionnaire and instructions were given on filling it up, their doubts cleared, and then it was administered to them.

Data analysis

The collected data was entered in MS Excel and analysed using SPSS (version 23.0) computer software. The descriptive statistics was done in terms of number percentage. A Chi square test and multiple logistic regression analysis was done to assess the association between variables of interest. Fisher's exact test and Yates correction factor has been applied where it was necessary.

Knowledge was divided into "some knowledge" and "no knowledge" after intensive literature reviews [10, 11]. Participants who answered in the affirmative way were considered to have "some knowledge" while those who did not give any answer were considered to have "no knowledge". The questionnaire was an open ended one. Participants who gave at least one correct response regarding risk factors, signs and symptoms, modes of prevention of cervical cancer were considered as having

"some knowledge" and others "no knowledge".

Ethical clearance

Ethical clearance was obtained from the institutional ethics committee (Memo No. BMC/I.E.C./009) of Burdwan Medical College and Hospital and data was collected thereafter. A written informed consent was obtained from the participants and all the data collected was kept confidential.

Results

The sociodemographic profile of study subjects revealed that majority of the study participants were from 1st year of college 105 (43.8%) and rest were from 2nd year 69 (28.7%) and 3rd year 66 (27.5%) respectively in urban college. Similar was the finding in rural college where number of 1st year students was 86 (47.9%) and rest of the students were from 2nd year 47 (26.1%) and 3rd year 47 (26.1%) respectively. Majority were males from urban college 129 (53.8%) and females from rural college 95 (52.8%). The mean age among the study participants in urban college was 20.09±2.53 years and in rural college was 19.91±2.24 (mean± SD). Most of the participants were Hindu from both urban 165 (68.8%) and rural 129 (71.7%) colleges. Regarding the socioeconomic status of the study participants according to modified B.G. Prasad Scale (October 2023) [12], it was seen that 33.8% of the study participants belonged to lower middle class followed by 21.3% belonging to middle class from urban college and 35.6% of the study participants belonged to lower middle class (Rs 2729-4550) followed by 22.2% belonging to middle class from the rural college. Family history of cancer was present among 29 (12.1%) participants of urban college and 24 (13.3%) participants of rural college.

Overall knowledge on cervical cancer

To determine the overall knowledge about cervical cancer, its screening test and about HPV vaccine a set of five open ended questions were used. The results regarding the knowledge of cervical cancer among study subjects, revealed that in terms of awareness only a meagre 80 (33.3%) from urban college and 52 (28.9%) from rural college had heard about cervical cancer. The knowledge about whether cervical cancer can be prevented or not showed 47 (19.5%) from urban college and 29 (16.1%) from rural college had knowledge about prevention. 19 (7.9%) from the urban college and 12 (6.6%) from the rural college had heard about the pap smear test. The knowledge about Human Papilloma Virus (HPV) infection among study subjects showed 51 (21.3%) of respondents from urban college and 42 (23.3%) respondents from rural college had heard about HPV. The knowledge of Human Papilloma Virus (HPV) vaccine among study subjects, revealed that 33 (13.8%) of urban college participants and 23 (12.7%) of their rural counterparts had heard about the HPV vaccine (Table 1).

For assessing knowledge regarding the causes (risk factors), signs and symptoms and modes of prevention of cervical cancer, three open ended questions were used. It was revealed that majority of the participants 52 (21.6%) from urban college and 31 (17.2%) from rural college had "no knowledge" about the causes (risk factors) of cervical cancer. Only about 28 (11.6%) from urban college and 21 (11.6%) from rural college had "some knowledge" about risk factors. Among the various risk factors mentioned by them, HPV infection was known to 13 (5.4%) from urban college and 9 (5.0%) from rural college. It also revealed that only 2 (0.8%) from urban college said that cervical cancer is gene based and 2 (1.1%) from rural college pointed out poor hygiene to be one of the risk factors (Table 2).

Regarding knowledge about the signs and symptoms of cervical cancer it was observed that majority of the participants had "no knowledge" [57(23.7%) urban college and 34 (18.8%) rural college]. Only 23 (9.5%) from urban college and 18 (10.0%) from rural college knew some signs and symptoms. Among the various signs and symptoms pain abdomen was known to 11 (4.5%) from urban college and 10 (5.5%) from rural college. It was also seen that only a small percentage 1.6% from urban college and 1.6% from rural college knew that unusual vaginal discharge can be a sign and symptom of cervical cancer. Similarly, about modes of prevention, it was seen that 56 (23.3%) from urban college and 35 (19.4%) from rural college had no awareness but 9 (3.75%) from urban college and 10 (5.5%) from rural college, knew about vaccination as a preventive measure. Similarly, very few of the participants knew about other modes of prevention [24 (10.0%) from urban and 17 (9.4%) from rural college]. Among them 3 (1.2%) from urban college and 5 (2.7%) from rural college pointed out that getting tested in time, treating infection and following preventive health behaviours like adoption of safe sex practices were important modes of prevention of cervical cancer (Table 2).

Knowledge about HPV infection

To determine the knowledge about HPV infection, five open ended questions were used regarding the diseases caused by HPV, whether men can contract HPV, about the modes of transmission, vaccine availability

Table 1. Basic Questions on Cervical Cancer, Screening Test and HPV Vaccine among students from Urban and Rural College

Questionnaire Item	Urban college (n=240) n (%)	Rural college (n=180) n (%)
Heard about cervical cancer		
Yes	80 (33.3)	52 (28.9)
Whether cervical cancer can be prevented		
Yes	47 (19.5)	29 (16.1)
Heard about pap smear test		
Yes	19 (7.9)	12 (6.6)
Heard about HPV		
Yes	51 (21.3)	42 (23.3)
Heard about HPV vaccine		
Yes	33 (13.8)	23 (12.7)

Table 2. Knowledge about Cervical Cancer among Study Population from Urban and Rural College

Domains	Urban college (n=240) n (%)	Rural college (n=180) n (%)
Never heard about cervical cancer	160 (66.6)	128 (71.1)
Knowledge about risk factors of cervical cancer (multiple response)	n=80	n=52
HPV infection	13 (5.4)	9 (5.0)
Multiple sex partner	4 (1.6)	4 (2.2)
Early marriage	8 (3.3)	5 (2.7)
Smoking	8 (3.3)	10 (5.5)
Poor hygiene	5 (2.1)	2 (1.1)
Genetics	2 (0.8)	0 (0.0)
Don't know	52 (21.6)	31 (17.2)
Knowledge about signs and symptoms of cervical cancer (multiple response)	n=80	n=52
Pain abdomen	11 (4.5)	10 (5.5)
Abnormal vaginal bleeding	5 (2.1)	5 (2.7)
Unusual Vaginal discharge	4 (1.6)	3 (1.6)
Pain during or after sex	1 (0.4)	0 (0.0)
Fever	7 (2.9)	5 (2.7)
Tumour	1 (0.4)	0 (0.0)
Don't know	57 (23.7)	34 (18.8)
Knowledge about how cervical cancer can be prevented (multiple response)	n=80	n=52
Vaccination	9 (3.75)	10 (5.5)
Preventive health behaviours (maintaining good genital hygiene)	5 (2.1)	2 (1.1)
Regular Checkup	7 (2.9)	0 (0.0)
Test and medicine	3 (1.2)	5 (2.7)
Don't know	56 (23.3)	35 (19.4)

to the present study. This difference could be explained by the difference in study settings and due to the change in study population and also due to the questionnaire used.

Regrading knowledge about HPV vaccine, 12.7% participants had knowledge which was not similar to the findings in the study conducted by Manikandan et al [13] and Kadian et al [16] where it was shown that only 2.04% and 1.25% (rural area) and 4.3% (urban area) of the study participants respectively had knowledge about HPV vaccine. The differences were there due to the change

Table 3. Knowledge about HPV Infection and Vaccine among Study Population

Domains	Urban college n=240 n (%)	Rural college n=180 n (%)
Never heard about HPV	189 (78.7)	138 (76.6)
Knowledge about disease caused by HPV that is cervical cancer	n=51	n=42
Yes	21 (8.7)	16 (8.8)
Knowledge about men can get infected with HPV	n=51	n=42
Yes	22 (9.2)	10 (5.5)
Knowledge about mode of transmission of HPV (multiple response)	n=51	n=42
Sexual transmission	17 (7.1)	8 (4.4)
Blood	2 (0.8)	4 (2.2)
Don't know	33 (13.7)	32 (17.7)
Knowledge about availability of HPV vaccine at	n=51	n=42
Hospitals	13 (5.4)	8 (4.4)
Don't know	38 (15.8)	34 (18.8)
Knowledge about appropriate age/timing of beneficiaries of HPV vaccine	n=51	n=42
11 -12 years old	2 (0.8)	1 (0.5)
Up to 45 years old female	2 (0.8)	2 (1.1)
Don't know	47(19.5)	39 (21.6)

and appropriate age of application of HPV vaccine. Surprisingly, 189 (78.7%) from urban college and 138 (76.6%) from rural college never heard about HPV. Among those who heard, 21 (8.7%) from urban college and 16 (8.8%) from rural college knew that HPV caused cervical cancer. They were not aware about any other diseases caused by HPV. Only 22 (9.2%) from urban college and 10 (5.5%) from rural college knew that men can contract HPV infection. Very few participants knew about modes of transmission. Only 17(7.1%) from urban college and 8(4.4%) from rural college knew about sexual transmission as a mode of transmission. Regarding the knowledge about the place of availability of HPV vaccine and the beneficiaries maximum participants were unaware about it. Only 13 (5.4%) from urban college and 8 (4.4%) from rural college knew that the vaccine is available in the hospitals. 7 (19.5%) and 39 (21.6%) from urban and rural college respectively had no knowledge about the beneficiaries (Table 3).

Association between the sociodemographic variables and the knowledge about cancer and HPV vaccine in both rural and urban colleges was assessed. In bivariate analysis, gender was statistically significant with risk factors of cervical cancer (p=0.001) in urban college whereas in rural college gender and mother's occupation was statistically significant with risk factors of cervical cancer [(p=0.018) and (p=0.006)] (Table 4a).

Regarding signs and symptoms, gender was found to be statistically significant with signs and symptoms of cervical cancer in urban college (p=0.001) whereas in rural college mother's occupation was found to be statistically significant with signs and symptoms (p=0.002) (Table 4b).

Regarding modes of prevention, gender was found to be statistically significant with modes of prevention in urban college (p=0.003) (Table 4c).

Regarding HPV vaccine, gender was statistically significant with knowledge of HPV vaccine in the urban college (p=0.031) (Table 5).

A multiple logistic regression analysis was also done to find out the confounders if any. As far as risk factors were concerned, females were 3 times more knowlegeable than males in both rural and urban colleges.{ [3.653(1.436-9.293)] in urban and [3.642 (1.231-5.772)] in rural}. Again in rural college, respondents' whose mothers were employed were 6 times more knowlegeable than their counterpart[6.910 (1.565-3.501)].

It was seen that females were 4 times more aware than males[4.370 (1.489- 5.823)] about signs and symptoms and 3 times more aware than males[3.586 (1.324- 9.719)] about modes of prevention too in only urban college.

The respondents' whose mothers were employed in rural college were 6 times more aware about the signs and symptoms of cervical cancer than their counterpart [6.157 (2.130-8.433)] (Table 4a, Table 4b, Table 4c).

Discussion

The present study was conducted to assess the awareness about cervical cancer and HPV vaccine among urban and rural undergraduate college students in Purba Bardhaman District of West Bengal. The demographic findings of the present study showed that majority of the students were in the age group of <20 years (52.5% in urban college and 52.8% in rural college).

In the present study, regarding the level of knowledge about cervical cancer only 33.3% of the study subjects in urban college and 28.9% of the study subjects in rural college had heard about cervical cancer. This percentage was almost similar to studies conducted in Bangladesh and in a study conducted by Manikandan et. al, where only 34% and 30% of the students respectively had heard about cervical cancer [10, 13].

Among all the students who participated in the present study, 5.0%, 2.7%, 3.3% knew about HPV infection, early initiation of sexual behaviour or early marriage and smoking respectively as risk factors for cervical cancer. This finding was not similar to the study of Bangladesh [9], where 15%, 7% and 6% of study subjects knew about HPV infection, early initiation of sex and smoking respectively as risk factor for cervical cancer. The findings of present study were in contrast to the study conducted in Karnataka [14] where as high as 57.1%, 46.1% and 33.1% of the students knew about HPV infection, early sex and smoking respectively as risk factors. Again, in another study by Saha et al. [15] it was seen that only 29%, 13% and 12% of the study participants knew about infections of the cervix, early marriage and smoking as risk factors, which is in contrast with the present study findings. This was due to the open-ended questionnaire which was used for data collection for the present study.

From the present study, regarding knowledge about signs and symptoms about cervical cancer, 1.6% of the participants knew about unusual vaginal discharge, 2.1% knew about abnormal vaginal bleeding as signs and symptoms of cancer cervix. On the contrary the study conducted among Dhaka University students [10] showed that 26% knew about vaginal discharge and 5% knew about abnormal vaginal bleeding. Similarly in another study done at Haryana [16] it was seen that 14.7% (rural area) and 32.7% (urban area) of the study subjects knew about unusual vaginal discharge and 30.3% (rural area) and 21.8% (urban area) of the study subjects knew about abnormal vaginal bleeding. The disparity in the findings because of the study population and the open-ended questionnaire. The need for health awareness programmes and repeated health talks is the need of the hour.

Knowledge about vaccination as mode of prevention was found among 3.7% of students. This was in contrast to the finding of the study in Bangladesh [9] where 13% of the students knew about vaccination as the mode of prevention but it was only 1.25% (rural area) and 4.3% (urban area) in the study conducted in Haryana [16]. The differences were due to the change in the study population and study setting and also due to the questionnaire used as it had open ended questions.

Regarding Pap smear test as a screening test, 6.6% of participants knew about it in the present study which was in contrast with the study conducted by Saha et al. [15] where 11% of the participants had heard about Pap smear test. In another study by Kadian et. al [16] it was seen that 18.7% (rural area) and 23% (urban area) of the study subjects knew about pap smear test which was in contrast

Table 4a. Association of Knowledge about Causes (Risk Factors) of Cervical Cancer and Sociodemographic Profile among Study Population

Sociodemographic characteristics	Urban college (n=240) Risk factors (causes)				Rural college (n=180) Risk factors (causes)			
	Some knowledge n (%)	No knowledge n (%)	Odds ratio	Adjusted odds ratio	Some knowledge n (%)	No knowledge n (%)	Odds ratio	Adjusted odds ratio
Age (in years)								
<20	18 (14.3)	108 (85.7)	0.577 (0.254-1.308)	1.530 (0.639-3.667)	13 (13.7)	82 (86.3)	0.655 (0.258- 1.668)	2.104 (0.669-6.615)
≥20	10 (8.8)	104 (91.2)			8 (9.4)	77 (90.6)		
Gender								
Female	21 (18.9)	90 (81.1)	0.246 (0.100-0.603)	3.653 (1.436- 9.293)	15 (17.6)	70 (82.4)	0.315 (0.116-0.853)	3.642 (1.231-5.772)
Male	7 (5.4)	122 (94.6)			6 (6.3)	89 (93.7)		
Religion								
Hindu	20 (12.1)	145 (87.9)	0.866 (0.363-2.065)	1.212 (0.462-3.182)	18 (14.0)	111 (86.0)	0.385 (0.108-1.370)	2.951 (0.752-11.582)
Muslim	8 (10.7)	67 (89.3)			3 (5.9)	48 (94.1)		
Father's education								
≤class 10	6 (8.7)	63 (91.3)	0.645 (0.250-1.667)	1.094 (0.364- 3.283)	5 (10.6)	42 (89.4)	0.871 (0.300-2.523)	0.643 (0.175-2.360)
>class 10	22 (12.9)	149 (87.1)			16 (12.0)	117 (88.0)		
Mother's education								
≤class 10	16 (11.5)	123 (88.5)	0.965 (0.435-2.140)	0.705 (0.242-2.055)	10 (9.9)	91 (90.1)	0.679 (0.273-1.691)	0.816 (0.217-3.068)
>class 10	12 (11.9)	89 (88.1)			11 (13.9)	68 (86.1)		
Father's occupation*								
Non govt job	20 (10.3)	174 (89.7)	1.646 (0.649-4.176)	1.581 (0.474-5.274)	14 (9.9)	128 (90.1)	2.065 (0.768-5.548)	1.393 (0.315-6.158)
Govt job	7 (15.9)	37 (84.1)			7 (18.4)	31 (81.6)		
Mother's occupation								
Unemployed	25 (11.0)	202 (89.0)	2.424 (0.625-9.402)	1.599 (0.286- 8.937)	16 (9.7)	149 (90.3)	4.656 (1.415-5.320)	6.910 (1.565-3.501)
Employed	3 (23.1)	10 (76.9)			5 (33.3)	10 (66.7)		
Socioeconomic status								
≤middle class (Rs 2729-4550)	18 (15.1)	101 (84.9)	1.978 (0.872-4.486)	0.574 (0.231- 1.429)	12 (13.5)	77 (86.5)	1.420 (0.567-3.558)	0.807 (0.277-2.350)
>middle class (Rs 4551-9097)	10 (8.3)	111 (91.7)			9 (9.9)	82 (90.1)		

*father's occupation (urban college) n=238 n=238, 2 expired

Table 4b. Association of Knowledge about Sgns and Symptoms of Cervical Cancer and Sociodemographic Profile among Study Population

Sociodemographic characteristics	Urban college (n=240) Signs and symptoms				Rural college (n=180) Signs and symptoms			
	Some knowledge n (%)	No knowledge n (%)	Odds ratio	Adjusted odds ratio	Some knowledge n (%)	No knowledge n (%)	Odds ratio	Adjusted odds ratio
Age (in years)								
<20	16 (12.7)	110 (87.3)	0.450 (0.178-1.137)	1.866 (0.696-5.001)	12 (12.6)	83 (87.4)	0.525 (0.188-1.467)	2.995 (0.758-11.840)
≥20	7 (6.1)	107 (93.9)			6 (7.1)	79 (92.9)		
Gender								
Female	18 (16.2)	93 (83.8)	0.208 (0.075-0.582)	4.370 (1.489-5.823)	12 (14.1)	73 (85.9)	0.410 (0.147-1.146)	2.756 (0.871-8.724)
Male	5 (3.9)	124 (96.1)			6 (6.3)	89 (93.7)		
Religion								
Hindu	16 (9.7)	149 (90.3)	0.959 (0.377-2.438)	1.232 (0.432-3.513)	15 (11.6)	114 (88.4)	0.475 (0.131-1.716)	2.493 (0.620-10.028)
Muslim	7 (9.3)	68 (90.7)			3 (5.9)	48 (94.1)		
Father's education								
≤class 10	6 (8.7)	63 (91.3)	0.863 (0.325-2.289)	0.974 (0.313-3.035)	5 (10.6)	42 (89.4)	1.099 (0.370-3.267)	0.539 (0.135-2.163)
>class 10	17 (9.9)	154 (90.1)			13 (9.8)	120 (90.2)		
Mother's education								
≤class 10	15 (10.8)	124 (89.2)	1.406 (0.572-3.456)	0.429 (0.123-1.492)	9 (8.9)	92 (91.1)	0.761 (0.287-2.017)	0.410 (0.077-2.185)
>class 10	8 (7.9)	93 (92.1)			9 (11.4)	70 (88.6)		
Father's occupation*								
Non govt job	17 (8.8)	177 (91.2)	1.335 (0.464-3.836)	2.006 (0.482-8.357)	11 (7.7)	131 (92.3)	2.689 (0.965-7.497)	3.623 (0.582-22.566)
Govt job	5 (11.4)	39 (88.6)			7 (18.4)	31 (81.6)		
Mother's occupation								
Unemployed	20 (8.8)	207 (91.2)	3.105 (0.789-12.212)	3.027 (0.496-18.469)	13 (7.9)	152 (92.1)	5.846 (1.737-19.679)	6.157 (2.130-8.433)
Employed	3 (23.1)	10 (76.9)			5 (33.3)	10 (66.7)		
Socioeconomic status								
≤middle class (Rs 2729-4550)	13 (10.9)	106 (89.1)	1.361 (0.572-3.237)	0.892 (0.329-2.416)	9 (10.1)	80 (89.9)	1.025 (0.387-2.715)	1.323 (0.410-4.269)
>middle class (Rs 4551-9097)	10 (8.3)	111 (91.7)			9 (9.9)	82 (90.1)		

*father's occupation (urban college) n=238 n=238, 2 expired

Table 4c. Association of Knowledge about Modes of Prevention of Cervical Cancer and Sociodemographic Profile among Study Population

Sociodemographic characteristics	Urban college (n=240)				Rural college (n=180)			
	Modes of prevention				Modes of prevention			
	Some knowledge n (%)	No knowledge n (%)	Odds ratio	Adjusted odds ratio	Some knowledge n (%)	No knowledge n (%)	Odds ratio	Adjusted odds ratio
Age (in years)								
<20	15 (11.9)	111 (88.1)	0.634 (0.266-1.512)	1.288 (0.514-3.228)	11 (11.6)	84 (88.4)	0.580 (0.205-1.643)	1.494 (0.494-4.521)
≥20	9 (7.9)	105 (92.1)			6 (7.1)	79 (92.9)		
Gender								
Female	18 (16.2)	93 (83.8)	0.252 (0.096-0.660)	3.586 (1.324-9.719)	11 (12.9)	74 (87.1)	0.454 (0.160-1.285)	2.081 (0.704-6.156)
Male	6 (4.7)	123 (95.3)			6 (6.3)	89 (93.7)		
Religion								
Hindu	16 (9.7)	149 (90.3)	1.112 (0.454-2.725)	0.956 (0.356-2.570)	13 (10.1)	116 (89.9)	0.759 (0.236-2.449)	1.421 (0.411-4.914)
Muslim	8 (10.7)	67 (89.3)			4 (7.8)	47 (92.2)		
Father's education								
≤class 10	5 (7.2)	64 (92.8)	0.625 (0.224-1.746)	1.215 (0.376-3.920)	5 (10.6)	42 (89.4)	1.200 (0.399-3.609)	0.541 (0.145-2.024)
>class 10	19 (11.1)	152 (88.9)			12 (9.0)	121 (91.0)		
Mother's education								
≤class 10	14 (10.1)	125 (89.9)	1.019 (0.433-2.397)	0.683 (0.217-2.147)	8 (7.9)	93 (92.1)	0.669 (0.246-1.822)	1.347 (0.341-5.313)
>class 10	10 (9.9)	91 (90.1)			9 (11.4)	70 (88.6)		
Father's occupation*								
Non govt job	17 (8.8)	177 (91.2)	1.644 (0.608-4.444)	1.882 (0.518-6.845)	12 (8.5)	130 (91.5)	1.641 (0.540-4.986)	1.459 (0.330-6.464)
Govt job	6 (13.6)	38 (86.4)			5 (13.2)	33 (86.8)		
Mother's occupation								
Unemployed	22 (9.7)	205 (90.3)	1.694 (0.353-8.139)	0.876 (0.98-7.873)	16 (9.7)	149 (90.3)	0.665 (0.082-5.395)	0.644 (0.070-5.926)
Employed	2 (15.4)	11 (84.6)			1 (6.7)	14 (93.3)		
Socioeconomic status								
≤middle class (Rs 2729-4550)	14 (11.8)	105 (88.2)	1.480 (0.630-3.477)	0.799 (0.309-2.065)	9 (10.1)	80 (89.9)	1.167 (0.429-3.175)	0.796 (0.270-2.345)
>middle class (Rs 4551-9097))	10 (8.3)	111 (91.7)			8 (8.8)	83 (91.2)		

*father's occupation (urban college) n=238 n=238, 2 expired

Table 5. Association of Knowledge about HPV Vaccine and Sociodemographic Profile among Study Population

Sociodemographic characteristics	Urban college (n=240) HPV vaccine				Rural college (n=180) HPV vaccine			
	Some knowledge n (%)	No knowledge n (%)	Odds ratio	Adjusted odds ratio	Some knowledge n (%)	No knowledge n (%)	Odds ratio	Adjusted odds ratio
Age (in years)								
<20	22 (17.5)	104 (82.5)	0.505 (0.233-1.094)	1.558 (0.685-3.547)	16 (16.8)	79 (83.2)	0.443 (0.173-1.136)	2.037 (0.729-5.696)
≥20	11 (9.6)	103 (90.4)			7 (8.2)	78 (91.8)		
Gender								
Female	21 (18.9)	90 (81.1)	0.440 (0.205-0.940)	2.123 (0.957-4.708)	13 (15.3)	72 (84.7)	0.652 (0.270-1.574)	1.721 (0.657-4.510)
Male	12 (9.3)	117 (90.7)			10 (10.5)	85 (89.5)		
Religion								
Hindu	24 (14.5)	141 (85.5)	0.801 (0.353-1.819)	1.225 (0.502-2.990)	19 (14.7)	110 (85.3)	0.493 (0.159-1.527)	2.117 (0.618-7.255)
Muslim	9 (12.0)	66 (88.0)			4 (7.8)	47 (92.2)		
Father's education								
≤class 10	10 (14.5)	59 (85.5)	1.091 (0.489-2.431)	0.453 (0.160-1.283)	9 (19.1)	38 (80.9)	2.013 (0.807-5.019)	0.235 (0.069-0.805)
>class 10	23 (13.5)	148 (86.5)			14 (10.5)	119 (89.5)		
Mother's education								
≤class 10	15 (10.8)	124 (89.2)	0.558 (0.266-1.168)	2.757 (1.012-7.512)	9 (8.9)	92 (91.1)	0.454 (0.185-1.112)	4.755 (1.420-15.920)
>class 10	18 (17.8)	83 (82.2)			14 (17.7)	65 (82.3)		
Father's occupation*								
Non govt job	25 (12.9)	169 (87.1)	1.279 (0.515-3.179)	0.940 (0.315-2.804)	19 (13.4)	123 (86.6)	0.762 (0.243-2.389)	0.422 (0.107-1.669)
Govt job	7 (15.9)	37 (84.1)			4 (10.5)	34 (89.5)		
Mother's occupation								
Unemployed	32 (14.1)	195 (85.9)	0.508 (0.064-4.040)	0	22 (13.3)	143 (86.7)	0.464 (0.058-3.708)	0.601 (0.064-5.636)
Employed	1 (7.7)	12 (92.3)			1 (6.7)	14 (93.3)		
Socioeconomic status								
≤middle class (Rs 2729-4550)	17 (14.3)	102 (85.7)	1.094 (0.524-2.281)	0.795 (0.346-1.827)	11 (12.4)	78 (87.6)	0.928 (0.387-2.229)	0.671 (0.246-1.826)
>middle class (Rs 2729-4550)	16 (13.2)	105 (86.8)			12 (13.2)	79 (86.8)		

*father's occupation (urban college) n=238 n=238, 2 expired

in study population in the previous studies and due to the questionnaire used for data collection.

Regarding the test of significance, the present study showed that there is significant association between gender and the knowledge of cervical cancer in both urban and rural colleges. It was seen that females had more knowledge about cervical cancer compared to males. These findings were similar to studies conducted by S. Rashid et. al [17] and S. Hussain et. al [18], where it was seen that females had more knowledge compared to males. It was also seen that mother's occupation had an impact on the knowledge of risk factors and signs and symptoms of cervical cancer. This finding was in contrast with another study [19] where mother's occupation had no impact on the knowledge of cervical cancer. The results showed in our study suggest that even after the advent of vaccines to prevent HPV infection and occurrence of cervical cancer, there has not been any major improvement in HPV awareness especially in developing countries, like India.

Strength and limitation

The study was conducted among undergraduates who are a vulnerable age group and rural urban differences were studied. The findings of the present study might not be generalized among general population as the sample size was small and it was conducted among undergraduate college students only. Again, two colleges were selected purposively due to limited timeframe hence the findings cannot be generalised. There were no previous educational campaigns held regarding cervical cancer and HPV vaccine in both the selected colleges which can influence the outcome of the study.

In conclusion, knowledge about cervical cancer and its prevention including HPV vaccination was present among only 30% of the study participants. Participants were not aware about the signs and symptoms and also the various modes of prevention of cervical cancer. There is a need to generate widespread awareness about prevention and screening of cervical cancer through community participation, health education using mass media, campaigns, and inclusion of such topics in school and college health education classes. Involvement of both government and non-governmental organisations is needed. Governmental organisations can help in making stringent policies regarding screening of cervical cancer, HPV vaccination of young adults or adolescent group. Nongovernmental organisations can help in spreading awareness regarding cervical cancer and HPV vaccine with the help of media flyers etc.

Author Contribution Statement

Dr. Sulagna Das : Conceptualization, Methodology, Formal analysis, Writing - Original Draft, Writing - Review & Editing, Visualization and Supervision. Dr.Mohini Datta: Resources, Conceptualization, Methodology, Data Analysis Writing - Original Draft, Writing - Review & Editing. Dr.Subhendu Bhuin: Conceptualization, Methodology, resources. Dr. Prof Sima Roy : Conceptualization, Methodology, Review & Editing, Visualization and Supervision. Dr. Prof Pranita Taraphdar: Conceptualization, Methodology, Visualization and Supervision.

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Ethical Declaration

Ethical clearance was obtained from the institutional ethics committee (Memo No. BMC/I.E.C./009) of Burdwan Medical College and Hospital and data was collected thereafter. A written informed consent was obtained from the participants and all the data collected was kept confidential.

Conflict of Interest

No conflict of interest.

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